SGS NDT TRAINING & EXAMINATION CENTRE

PROFESSIONAL SERVICES FOR YOUR SAFETY AND REPUTATION
ABOUT NON-DESTRUCTIVE TESTING (NDT)

NDT plays a key role in assessing conformity and reliability of equipment and piping used in infrastructure, oil and gas and power industry. With the right NDT technology integrity assessments are made and corrosion data is gathered. New and older technologies, however, only being added value when used in a proper way. Therefore operator training and certification is the key in every inspection programme to ensure compliance and improve quality and integrity.

Often expectations are not met because the operator was not trained well or wrong equipment has been used. Bad performed inspections can lead to unsafe situations, productions loss and non-conformities in international trade business.

The reliability of the NDT depends on many factors and operator training is one of the critical areas that are only too often overlooked. SGS NDT Training & Examination Centre can help you to manage risk, protect your company and its reputation.

ABOUT SGS NDT TRAINING & EXAMINATION CENTRE

China represents huge business opportunities for every ambitious company in the industrial markets. The market of China is ever increasing at an incredible pace, however, one area of concern that international clients have is the quality of the products produced in China. Often after delivery from the manufacturer in China it is found that the quality of the materials and products are not meeting the clients’ requirements and expectation.

To manage this risk, NDT inspections are performed during and after manufacturing of the products, however, these tests and inspections are carried out by inspectors who have usually received little or inadequate training and examinations.

SGS now offers internationally recognised training and certification services in NDT in China. The aim is to create a wider availability of inspectors and technicians who are trained and certified in accordance with the European and American standards for the qualification and certification of NDT personnel, EN 473. This will ensure an increased quality of the inspection and therefore provide a lower risk of products being out of specification on arrival at their destination.

The training and examinations that SGS offer are in accordance with the highest European and American standards (EN 473/ISO 9712/ASNT), with a particular focus on the extensive training syllabus for all NDT methods and will offer Personal Certification of NDT (PCN) which are issued by the British Institute of NDT (BINDT).

The need for high quality NDT service in China is growing at a rapid pace and this new service is attractive for all companies and institutions that are doing business with international customers.

The courses will be held in Shanghai, Shenzhen and at company premises should it be specifically requested. Examples of these services are:

- Basic NDT awareness for engineers and managers
- PCN/EN 473/ISO 9712 Level 1, 2 and 3 courses in RT, UT, MT, PT, VT, TOFD
- SNT-TC-1A Level 1, 2 and 3 course in RT, UT, MT, PT, VT, TOFD, ET
- ASNT/PCN/EN 473 Level 3 consultancy services
- PED audit services
BASIC RADIATION SAFETY (BRS) & RADIATION PROTECTION SUPERVISORS (RPS)

BRS
To be eligible for the Radiographic Testing examination at either Level 1 or Level 2, the candidate must first successfully pass a Basic Radiation Safety (BRS) examination.

The minimum training hours for this examination is 16 hours and is in addition to the hours required for either Level 1 or Level 2 Radiographic Certification.

BRS COURSE CONTENT
- Basic Radiation Physics
- Radiographic Equipment
- Radiation Units
- Biological Effects
- Dose Limits
- Radiation Detection and Measurement
- Protection against Radiation
- Calculations for Radiation Protection
- Storage of Radiation Sources
- Transport of Radioactive Substances
- Appointments & Responsibilities
- Local Rules and Contingency Plans
- Personal Dosimetry
- Normative Documents
- Knowledge and Understanding of IRR 1999

RPS
For candidates who are working with ionising radiation in supervisory roles an additional advanced training course and examination are available, which is the PCN – Radiation Protection Supervisor (RPS). The minimum requirements for taking this examination are
- Must hold a current BRS certification
- An additional 24 hours training
- Must have held BRS certification for a minimum of 9 months

RPS COURSE CONTENT
- Review of Basic Radiation Safety
- Normative Documents and Legislative Structure
- Biological Effects
- Radioactive Substances Act
- Dose Limitation
- The Regulation of Work with Radiation
- The Role of the RPA and RPS
- Advanced Scientific Calculations for Radiological Protection
- Principles and Practices of Radiation Protection
- Radiation Monitoring
- Transport of Radioactive Substances
- Personal Dosimetry
- Emergency Procedures
- The Ionising Radiations Regulations 1993
- Knowledge and Understanding of IRR 1999

VISUAL INSPECTION (VT)
This method involves both direct and indirect visual inspection techniques, direct inspection is where the material is inspected directly by the human eye with no additional visual aids, indirect inspection may involve the use of magnifying glass, mirror, borescope (mini camera), closed-circuit TV, etc.

Visual Inspection is a crucial NDT method which is too often overlooked, this should be the basis for inspectors starting out in the NDT industry, for example, a visual examination of an operational plant can often reveal obvious problem areas, such as leaks, excess vibration, corrosion or misalignment, this inspection is a very cost effective exercise and can be used to identify areas that require further NDT applications.

WORK EXPERIENCE AND TRAINING HOURS' REQUIREMENTS FOR VT EXAMINATIONS

LEVEL 1
- 32 hours training
- 1 month work experience

LEVEL 2
- 40 hours training
- 4 months work experience

We can provide visual test training courses and examinations suitable for any of the following certification schemes.
- PCN/EN 473/ISO 9712 Level 1, 2 and 3
- SNT-TC-1A Level 1, 2 and 3 in accordance with your company written practice

We can also provide
- Preparation training for ASNT Level 3
- Preparing and approving written practice/procedures/working instruction
- Level 3 witness

SGS can tailor the syllabus to satisfy the requirements of an individuals company specific written practice if requested.
MAGNETIC PARTICLE INSPECTION (MT)

This method involves the component being magnetised, this magnetisation process is supplemented by the application of ferromagnetic particles to the already magnetised surface. The magnetic particles are attracted to areas of flux leakage (escaping magnetism) and indications formed at that point. This method is used to inspect welds, castings, and forgings for surface or slightly subsurface defects. However, MT can only be used to inspect materials that can be magnetised, i.e. ferromagnetic materials.

WORK EXPERIENCE AND TRAINING HOURS’ REQUIREMENTS FOR MT EXAMINATIONS

LEVEL 1
- 32 hours training
- 1 month work experience

LEVEL 2
- 40 hours training
- 4 months work experience

We can provide Magnetic Particle training courses and examinations suitable for any of the following certification schemes:
- PCN/EN 473/ISO 9712 Level 1, 2 and 3
- SNT-TC-1A Level 1, 2 and 3 in accordance with your company written practice

We can also provide:
- Preparation training for ASNT Level 3
- Preparing and approving written practice/procedures/working instruction
- Level 3 witness

SGS can tailor the syllabus to satisfy the requirements of an individual's company specific written practice if requested.

LIQUID PENETRANT INSPECTION (PT)

This involves applying a liquid dye to the surface of a material and leaving the dye to “dwell” on the surface for a predetermined period of time. The liquid can be either a colour that is easily visible under normal lighting conditions or a yellow/green fluorescent colour that requires special lighting conditions to be seen effectively.

This liquid dye enters into discontinuities that are open to the surface of the material through a phenomenon called “capillary action”. This capillary action takes place throughout the dwell time and the discontinuity retains this dye when the excess dye is cleared from the surface. A type of developer is then applied to the surface of the material and the dye that is trapped inside the surface discontinuities is blotted back out onto the surface and forms an indication. This indication is then interpreted by a qualified interpreter.

The PT method is suitable on most non-absorbent materials.

WORK EXPERIENCE AND TRAINING HOURS’ REQUIREMENTS FOR PT EXAMINATIONS

LEVEL 1
- 32 hours training
- 1 month work experience

LEVEL 2
- 40 hours training
- 4 months work experience

We can provide Liquid Penetrant (PT) training courses and examinations suitable for the following certification schemes:
- PCN/EN 473/ISO 9712 Level 1, 2 and 3
- SNT-TC-1A Level 1, 2 and 3 in accordance with your company written practice

We can also provide:
- Preparation training for ASNT Level 3
- Preparing and approving written practice/procedures/working instruction
- Level 3 witness

SGS can tailor the syllabus to satisfy the requirements of an individual's company specific written practice if requested.
RADIOGRAPHIC TESTING (RT)

This method is based on the same principle as medical radiography in a hospital. A piece of radiographic film is placed on the remote side of the material under inspection and radiation is then transmitted through from one side of the material to the remote side where the radiographic film is placed.

The radiographic film detects the radiation and measures the various quantities of radiation received over the entire surface of the film. This film is then processed under dark room conditions and the various degrees of radiation received by the film are imaged by the display of different degrees of black and white, this is termed the film density and is viewed on a special light emitting device.

Discontinuities in the material affect the amount of radiation being received by the film through that particular plane of the material. Qualified inspectors can interpret the resultant images and record the location and type of defect present in the material.

Radiography can be used on most materials and product forms, e.g. welds, castings, composites, etc.

Radiographic testing provides a permanent record in the form of a radiograph and provides a highly sensitive image of the internal structure of the material. Radiography is split into two main categories:
- Radiographic Testing
- Radiographic Interpretation

The Radiographic Testing course is for NDT personnel who execute the practical inspection using radioactive material or radiation emitting devices. The radiographic interpretation course is designed purely for the interpretation of the resultant radiographic image. However, to understand the principles of image formation, sensitivity and correct techniques the general theory syllabus is the same for both courses.

The two sectors of the Radiographic Testing examination that are not required for the Radiographic Interpretation examination are:
- Basic Radiation Safety (BRS)
- Practical Examination of the Specimens

WORK EXPERIENCE AND TRAINING HOURS’ REQUIREMENTS FOR RT EXAMINATIONS

LEVEL 1
- 80 hours training
- 3 months work experience

LEVEL 2
- 120 hours training
- 12 months work experience

We can also provide:
- Preparation training for ASNT Level 3
- Preparing and approving written practice/procedures/working instruction
- Level 3 witness

SGS can tailor make the syllabus to satisfy the requirements of an individual company specific written practice if requested.

Radiographic Testing is split into specific product sectors for certification at Level 1 and 2, this is:
- Welds
- Castings

Each of these categories is further split into sub groups:
- Light metal X-ray
- Dense metal X-ray (and/or Gamma ray)
- Light and dense Metal, both X-ray and Gamma ray
ULTRASONIC TESTING (UT)

This method employs high frequency sound pulses that are emitted from a transducer; this sound wave is induced into the material through a probe which is usually in contact with the material. These sound waves propagate through the material, and are reflected back to the probe when they reach an interface. The reflected waves are transmitted back through the probe and connecting leads to a detector which can be either analogue or digital. The sounds waves are then displayed as a series of signals on a monitor and the qualified inspector can measure, and interpret these signals to allow accurate evaluation of the internal structure of the material.

Ultrasonic testing can not only be used to indicate a surface or subsurface flaw but can also be used to determine the depth, size and type of flaw. Another advantage of using UT is the accurate measurement of the thickness of the material. The method can be applied to most materials providing the material can transmit sound waves. UT is considered to be a fast and effective way of inspection providing high sensitive results.

WORK EXPERIENCE AND TRAINING HOURS’ REQUIREMENTS FOR UT EXAMINATIONS

LEVEL 1
- 80 hours training
- 3 months work experience

LEVEL 2
- 120 hours training
- 12 months work experience

We can provide Ultrasonic training courses and examinations suitable for any of the following certification schemes:
- PD6682/ISO 9712 Level 1, 2 and 3
- SNT-TC-1A Level 1, 2 and 3 in accordance with your company written practice

We can also provide
- Preparation training for ASNT Level 3
- Preparing and approving written practice/procedures/working instruction
- Level 3 witness

SGS can tailor make the syllabus to satisfy the requirements of an individuals company specific written practice if requested.

In the PCN certification scheme Ultrasonic Testing is separated into three specific product sectors for certification purposes, these are:
- Welds
- Wrought products (Forgings)
- Castings

The welds sector is further sub divided into groups, these are:
- Plate butt welds
- Pipe butt welds
- Constructional “T” joint
- Nozzles
- Nodes

EDDY CURRENT TESTING (ET)

Eddy current inspection is one of several NDT methods that use the principal of ‘electromagnetism’ as the basis for conducting examinations. Several other methods such as Remote Field Testing (RTF), Flux Leakage and Barkhausen Noise also use this principle. One of the major advantages of eddy current as an NDT tool is the variety of inspections and measurements that can be performed. In the proper circumstances, eddy currents can be used for:

- Cracks detection
- Material thickness measurements
- Coating thickness measurements
- Conductivity measurements

Some of the advantages of eddy current inspection include:
- Sensitivity to small cracks and other defects
- Detects surface and near surface defects
- Inspection gives immediate results
- Equipment is very portable
- Method can be used for much more than flaw detection

We can provide:
- Minimum part preparation is required
- Test probe does not need to contact the part
- Inspects complex shapes and sizes of conductive materials

We can provide:
- ET training courses and examinations suitable for SNT-TC-1A
- Preparing and approving written practices/procedures/working instruction
- Level 3 witness
TIME OF FLIGHT DIFFRACTION (TOFD)

Time of Flight Diffraction (TOFD) is becoming one of the widely used non-destructive testing methods for weld inspection. The main difference of TOFD technique is based on received ultrasonic diffractions which are from tip of imperfections instead of received reflected signals in conventional method.

The basic arrangement of the TOFD technique consists of two probes in the pitch-catch configuration, with one probe acting as the transmitter and the second probe as the receiver. Such an arrangement provides a large volume for inspection and provides for unambiguous location of the position and depth of the reflectors.

This advanced ultrasonic technique has special features such as highest probability of defect detection, very accurate sizing of defects better than 0.2 mm, increased speed of inspection, permanent digital record of the inspection data, efficient detection of defect, independent of defect orientation and highest reliability of inspection quality.

The application of TOFD technique can be classified into areas i.e., pre-service inspections of linear butt welds on vessels, pipeline and plates. In-service inspection which includes corrosion monitoring, cladding measurement and condition monitoring (growth of flaws) on different product sectors like marine engineering, oil & gas, large-sized steel structure, wind power industry, aircraft industry and so on.

WORK EXPERIENCE AND TRAINING HOURS’ REQUIREMENTS FOR TOFD EXAMINATIONS

LEVEL 1
- 40 hours training
- 3 months work experience

LEVEL 2
- 80 hours training
- 12 months work experience

All candidates attempting PCN examination must hold BINDT recognized appropriate level of certification in conventional Ultrasonic Weld Testing, issued by a certification body recognized by BINDT. We can provide TOFD training courses and examinations suitable for any of the following certification schemes.
- PCN/EN473/ISO 9712 Level 1, 2 and 3
- Preparing and approving written practice/procedures/working instruction
- Level 3 witness
- SNT-TC-1A Level 1, 2 and 3 in accordance with your company written practice

HOW TO BOOK YOUR TRAINING COURSE

To book a training course or to receive a quotation from the SGS Training and Examination Centre, simply call +86 (0)21 6818 3905 and we will be happy to discuss your requirements with you. If necessary we can provide advice on which type of training and certification is appropriate for you or your company. SGS can also conduct a specific training and examination course to meet your company requirements. Enquiries may also be made via email to ndt.training@sgs.com

On confirmation of the booking we will send to you an application form which must be completed and returned to us in order to confirm the booking process. Our staff will be on hand to provide the necessary assistance and support in completing the required information.

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WHEN YOU NEED TO BE SURE